The Business Advantages of Intel® Processors and Platforms

Enterprise IT managers face unique challenges as they strive to provide the best tools for users, increase IT efficiency and reduce deployment costs. Intel® processors, platforms and services help businesses meet these objectives, while providing a scalable foundation for future growth.

Executive Summary

Choosing and maintaining end-user systems are ongoing challenges for enterprise IT organizations. The selection of platforms, vendors and configurations can have far-reaching consequences. Because of the large number of units, seemingly small advantages in performance, reliability, compatibility, system life and support costs can have a major cumulative impact on the bottom line – particularly when viewed over the three-year or longer lifecycle of the typical business PC.

Making the right decision depends on a wide range of variables. What is the right balance between server-based resources, client-side capacity and acquisition costs? What integrated technologies will prove useful – even essential – over the life span of newly purchased systems? How will compatibility, reliability, manageability and product availability affect total cost of ownership? Based on these and related factors, IT managers make decisions that impact user productivity and support costs for each new wave of PCs they purchase.

This paper outlines key criteria for choosing vendors and configuring desktop systems for a large business. It explains why systems incorporating Intel processors and platforms offer the industry's most advanced, reliable and cost-effective solutions. Through an unrivaled combination of technical innovation, platform stability, compatibility, reliability, manageability and product availability, Intel® processors and platforms help businesses support innovative computing solutions and a high level of end-user productivity – while minimizing risk and reducing long-term costs.

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The Business Benefits of Intel's Integrated Platforms

The corporate computing environment is becoming increasingly complex. End-user systems must now interoperate seamlessly with a wide variety of external systems and applications, both within the corporate LAN and beyond. Adding to this complexity is the rapid evolution of computing technologies and business models. With its three-year or longer life span, today's PC must support fast-changing application and business requirements.

Intel helps businesses manage this complexity with integrated, balanced platforms that are designed and thoroughly tested to work seamlessly in a wide variety of computing environments. Intel's expertise covers all the core components of PC technology, including the processor, motherboard, chipset, graphics and LAN connectivity components (Figure 1).

Intel platforms offer a high degree of integration. Networking and graphics capabilities are built into many Intel® chipsets and motherboards. Further, Intel develops the software that supports core system functionality, including drivers for graphics, audio, storage, security and LAN connectivity. All these elements are designed cooperatively and tested exhaustively in conjunction with the full range of Intel® Pentium® brand processors. The result is a higher level of integration, compatibility and reliability – plus industry-leading support for emerging PC standards, some of which are initiated and developed by Intel itself.

Consistency Across the Enterprise

Platform standardization helps businesses to reduce their total cost of ownership in many ways, including:

- Simplifying asset management
- Enabling unified support processes
- Minimizing the number of software images supported throughout the enterprise
- Maintaining fewer drivers
- Reducing spare parts inventories

Intel develops and manufactures many of the key components of the platform stack, including processors, chipsets, motherboards and software elements such as BIOS and drivers (Figure 2). Equally important, Intel develops these components for desktops, laptops, workstations and servers. As a result, businesses can count on a common set of core technologies across all their platforms, increasing their ability to implement consistent, standardized solutions throughout the enterprise.

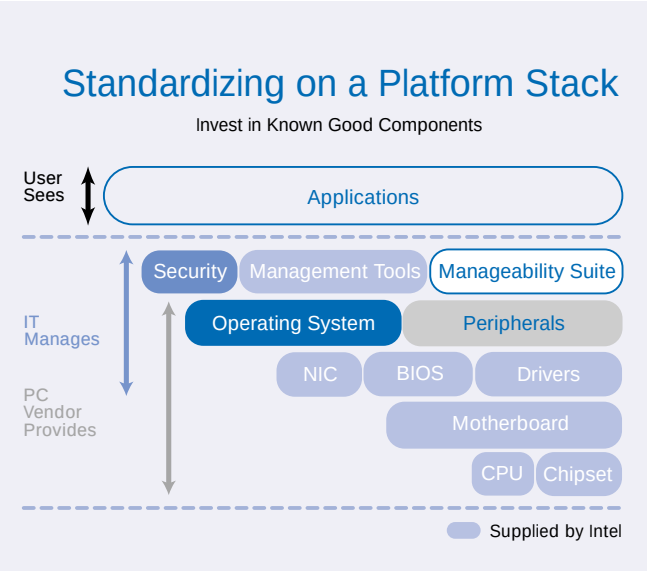

Figure 1: Intel delivers the building blocks for balanced platforms that are designed and thoroughly tested to deliver the highest levels of performance, compatibility and reliability.

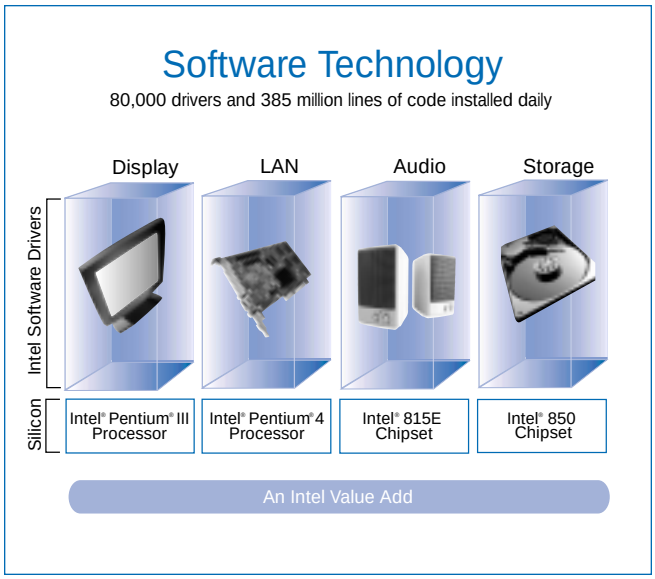

Figure 2: Intel platform software includes key technologies such as security, BIOS and numerous drivers. These vital platform elements provide backward compatibility and stability, while supporting new products and environments.

Stable Platforms and Transition Management

Platform qualifications and transitions can be time-consuming and costly for IT. Intel, in conjunction with major PC manufacturers, offers transition guidance that defines the most cost-effective migration path. Intel defines a maximum performance platform for power users, and a mainstream platform for users running standard business applications. Mobile guidelines include three distinct platforms: full size, thin and light, and mini-notebook.

These recommendations help businesses to plan their transitions cost-effectively. Following a new launch, Intel typically supports platform and component availability for at least 12 months.[1] By taking advantage of Intel platform guidance, businesses can plan transitions to maximize platform availability. This reduces the frequency of transitions, and reduces the time and money invested in qualifying new platforms (Figure 3).

[1]Actual product support may be considerably longer. Intel currently supports many products that were launched two or more years ago.

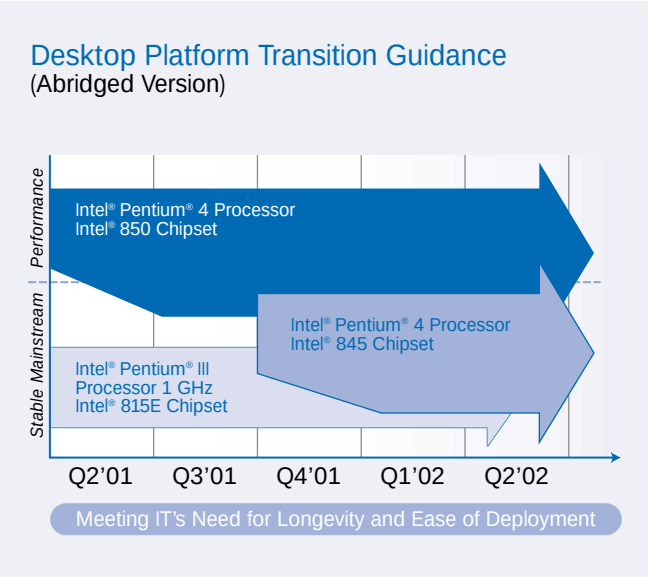

Figure 3: Intel's desktop platform transition guidance helps businesses to take maximum advantage of platform longevity and availability, for smooth, cost-effective migrations to next-generation systems.

Comprehensive Quality Control

Intel is widely recognized for its comprehensive validation of processors and platforms. In 2000 alone, Intel spent more than $200 million on validation testing, with over 900 employees involved in compatibility and reliability programs. Extensive CPU and system tests ensure compatibility and optimized performance with a wide range of operating systems, network devices, third-party hardware components and software applications. The validation testing for all Intel® processors, including the new Intel® Pentium® 4 processor, offers an example of the importance Intel assigns to quality control (Figure 4). A similar level of testing is employed with all Intel® chipsets and other platform components.

Given the enormous complexity of today's computing solutions, minor problems may still surface during the life of a processor or other platform component. Intel therefore checks trouble reports regularly and communicates the results via Intel's web sites. Patches, BIOS updates and work-arounds are freely available. Intel is firmly committed to this straightforward approach to customer support.

Compatibility with Third-Party Hardware and Software

Intel's internal testing programs are part of a larger cooperative effort with third-party vendors throughout the industry. Intel works extensively with PC manufacturers, hardware vendors and software developers to ensure optimized performance and compatibility on Intel platforms. The popularity of Intel® architecture-based solutions gives vendors strong motivation to test and tune their products for Intel platforms. This creates a synergy that benefits all parties, especially the business purchaser who can rely on a vast array of optimized applications and components.

Improved Asset Management

As many studies have shown, the original purchase price for a PC comprises only a fraction of the total cost of ownership (TCO) incurred by a business to operate a PC. Maintenance and support expenditures can dwarf acquisition costs over the life of the system. The right choice of processors and platforms can help reduce these long-term costs. The following factors play a critical role in improving asset management and reducing TCO.

Validation for Intel® Pentium® Processors

Duration: Intensive validation from initial design through the life of the product

Intel® Pentium® III Processor Tests

- 2200 CPU features tests
- 2000 ancestral architectural tests
- 20 billion random instruction tests per week
- I/O stress tests with millions of chipset feature permutations

Intel® Pentium® 4 Processor Tests

All Intel Pentium III processor test suites, plus:

- Enhanced random instruction testing to "warm up" CPU pipeline
- 1 trillion random instruction tests per week
- 250 new CPU-focused feature tests
- Twice as many platforms tested

Figure 4: The exhaustive validation testing for Intel Pentium III and Pentium 4 processors is just one example of Intel's commitment to quality and compatibility. Similar levels of testing are employed for chipsets and other platform components.

Stable Software Images

Businesses can lower their administrative costs by reducing the number and volatility of the software images they deploy. In part, this depends on IT policies regarding standard software configurations. However, a stable software image at the platform level is also a major advantage. Intel incorporates a high level of driver uniformity across multiple platforms, and invests considerable resources to preserve backwards compatibility in successive releases. As a result, fewer software images can be deployed across more systems, and can be retained longer as new generations of PCs are added to the environment.

Efficient Management Solutions

IT organizations can improve asset management and operational efficiency through centralized system management. Intel's desktop, mobile and server platforms all contain advanced instrumentation that adheres to established industry standards, including the Wired for Management (WfM) Baseline specification, v. 2.0. Businesses can take advantage of LAN-based remote wake-up, DMI Instrumentation, and PXE (Preboot eXecution Environment) to:

- Automate the deployment of new systems
- Maintain standard desktop configurations
- Automate off-hours tasks, such as software distribution
- Improve the remote collection of system information
- Deploy consistent management tools and processes

The value of these automated and remote management tools is more easily gauged in terms of typical on-site support costs, which may range from $150 to $200 per average service call, and from $400 to $600 per system replacement. Efficient tools for configuration, management and troubleshooting can reduce service costs substantially over the life of a PC. More efficient management can also extend system life, which in turn improves return on investment, due to better amortization.

Businesses that are already managing their systems remotely will benefit from the high level of manageability built into Intel platforms. Businesses that still rely primarily on hands-on system maintenance can keep their options open by deploying manageable desktops and mobile PCs. Should they decide to implement a centralized management solution in the future, an installed base of manageable PCs will significantly accelerate their return on investment.

Performance Headroom

The life cycle of a computing platform depends on its power and flexibility to handle new and upgraded applications. The purchase of high-performance systems can therefore save money by reducing PC rollover. Sufficient performance at the desktop also allows a variety of processing-intensive activities – such as encryption, file compression and virus checks – to be handled as background applications on clients. This helps IT establish and enforce more effective client policies, to reduce server and network loads. Intel provides a range of performance options on each platform, so businesses can tailor their system purchases to optimize longevity versus acquisition costs. The widespread compatibility of Intel platforms and processors helps to extend these benefits.

Industry Leadership

Intel's expertise extends well beyond the PC, and includes products and services that touch most segments of today's computing industry. Extensive resources are devoted to research and development in every key area, to develop new technologies and deliver better, more cost-effective solutions. Intel also works continuously with customers and industry leaders to define and develop the future of business computing. Following are several examples of key industry initiatives that Intel leads or supports:

- The Intel Developers Forum brings together leading hardware and software manufacturers to establish a common vision. Through ongoing cooperation, members develop and integrate technologies that add value for businesses.
- The Intel® e-Business Network is a global community of hardware manufacturers, software developers, service providers, system integrators, resellers, Web integrators and consultants. By working together, IeBN members sustain a high level of innovation and produce practical, integrated e-Business solutions.

- The Desktop Management Task Force, in conjunction with the Intel Wired for Management (WfM) Initiative, has fueled the creation of centralized and automated PC management solutions.
- Intel Capital is one of the largest corporate investment programs in the technology industry, with investments in broadband, networking, web groupware, e-Commerce application development and many other fields.

These efforts, among others, are part of a wide-ranging industry involvement that enables Intel to base new designs on a realistic assessment of emerging technologies and industry trends. By sharing its broad expertise, Intel helps other businesses create complementary solutions that add value to the platform. As a result, business customers can count on a wide variety of innovative, cost-effective solutions, based on the broad and coordinated support for Intel architecture.

Technology Leadership

Since Intel is constantly working to define new standards and technologies, Intel® products have typically been among the first to support these solutions (Figure 5). Examples include the PCI bus, the Universal Serial Bus (USB), Wired for Management standards, IPSec LAN security solutions and Bluetooth* wireless technology. Intel's leadership in these and other initiatives enables forward-thinking designs that help to prolong the life of each system, while simplifying deployment and support. Intel's silicon expertise enables these technologies to be integrated quickly and reliably into the core components of the PC, providing outstanding functionality and performance at a broad range of price points.

More importantly, Intel® architecture-based PCs are available in a wide variety of configurations from hundreds of PC manufacturers worldwide. This makes it easier for businesses to purchase desktops and laptops with the features and price/performance that meet their requirements.

Intel is in the forefront of e-Business in its own business practices, as well, with an average of over $1 billion worth of online orders per month from customers in 46 countries. Customers can check on product specifications, pricing, availability and order status in real time, in a secure and highly personalized environment. About half of Intel's direct customers do business with the company online. With this level of involvement in e-Business, Intel is totally committed to building the resources needed for success in the Internet economy.

Manufacturing Excellence

Quality and Progress

Intel continues to lead the industry in manufacturing innovation and quality. Through continuous advances in chip architecture and circuit density, Intel has helped businesses to access a level of computing power and functionality that was virtually unimaginable a few decades ago.

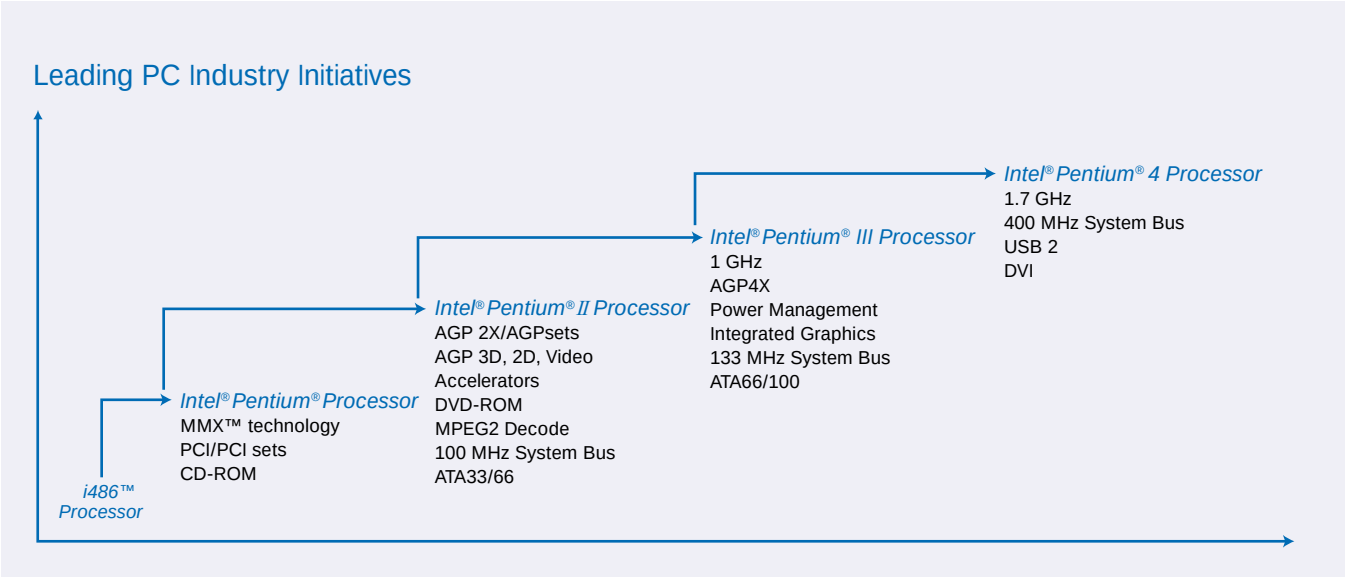

Figure 5: Intel technology leadership brings new functionality, including vital manageability features, to business platforms.

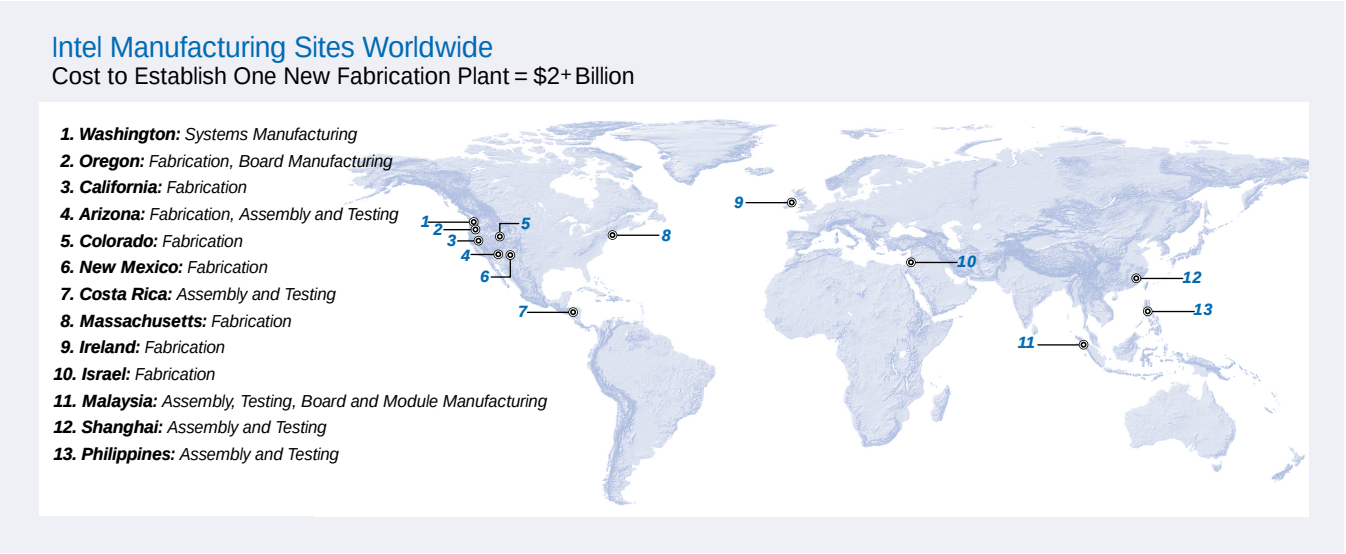

Figure 6: With numerous manufacturing facilities located throughout the world, Intel can quickly ramp up production – even on the newest technologies – to meet customer demand.

More recently, the Intel® Pentium® 4 processor has set the stage for another evolution in processor performance. Based on the new Intel® NetBurst™ Micro-architecture, the Pentium 4 processor eliminates roadblocks to clock speed, accelerates common integer-based operations, and boosts multimedia tasks such as video, audio and speech recognition. More importantly, it establishes an architecture that will scale to support the enormous demands of tomorrow's business environment, in which fast multimedia performance will be essential.

In parallel with processor and platform design, Intel continues to push the frontiers of silicon manufacturing processes. In five years, the company's products have advanced from the original Pentium® processor with 3.2 million transistors, to the Pentium 4 processor with 42 million transistors. Intel currently deploys 0.18-micron silicon manufacturing capabilities in fabrication plants throughout the world, and plans to introduce products based on the 0.13-micron technology in the near future. This will be followed closely by 0.10-micron and 0.07-micron processes, which are already in development.

Volume and Availability

Intel's worldwide manufacturing infrastructure (Figure 6) lets the company ramp up quickly to meet product demand. This high-volume capacity is supported by Intel's renowned "copy exactly" approach, in which processes are refined to deliver top quality and yield in a single facility, and then precisely duplicated in other facilities. This approach helps to ensure that Intel quality is fully preserved as production is expanded to multiple facilities around the world.

The advantage for business customers is that they can establish their near- and long-term plans with the confidence that platform performance, quality and availability will meet their requirements. To support these benefits into the future, Intel plans to double its manufacturing capacity within the next three years, and is increasing its capital investment to $7.5 billion for 2001, up from $6.7 billion in 2000.

Corporate Strength

For decades, Intel has played a leading role in increasing the value of business computing solutions, through its own efforts and through broad collaboration with other industry leaders. The high quality of Intel products and services has been, and continues to be, a direct reflection of the quality of Intel's vision and its ability to implement that vision on a global scale.

Industry experts agree, as demonstrated by *Fortune Magazine's* recent ranking of Intel in fourth place on its list of most admired companies in the world in 2000. *The Wall Street Journal* concurred, ranking Intel among the top ten

U.S. companies for best overall corporate reputation. The *Financial Times* also ranked Intel among the most valuable brands worldwide. Business users instantly recognize the names Intel and Pentium as hallmarks of quality and reliability. These independent assessments offer additional evidence that Intel will continue to play a leading role in defining and creating tomorrow's computing solutions.

Conclusion – The Intel Advantage

The reliability, scalability and performance of the corporate computing infrastructure have never been so critical. Businesses need highly reliable systems that are compatible with evolving technologies, standards and applications. They also need systems and vendors that support their need for stable platform transitions, so they can migrate to next-generation performance smoothly and cost-effectively.

Intel is uniquely qualified to help businesses address these needs. Intel processors and platform designs are based on Intel's direct participation and wide-ranging expertise in virtually all areas of computer technology. They include leading support for forward-thinking, standards-based technologies that help businesses maximize productivity and contain their costs.

Most importantly, Intel provides highly integrated and thoroughly tested PC platforms for the business marketplace. Intel processor-based PCs are available from hundreds of OEMs in a wide variety of configurations, providing the performance, reliability and product availability IT managers need to flexibly support a large population of end-users.

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